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**Building The  
Wireless Future™**

**CTIA**

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March 19, 1998

Ms. Magalie R. Salas  
Secretary  
Federal Communications Commission  
1919 M Street, NW Room 222  
Washington DC 20554

**RECEIVED**

MAR 19 1998

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

**Re: Ex Parte Presentation**

RM 9005 (Routine Licensing of Large Numbers of  
Small Antenna Earth Stations Operating in the  
Ka-Band)

Dear Ms. Salas:

On Thursday, March 19, 1998, the Cellular Telecommunications Industry Association ("CTIA") conducted an FCC Tutorial on the 18 GHz proceeding. The parties in attendance discussed the potential for spectrum sharing between fixed microwave services and mobile satellite services. CTIA was represented by Michael Altschul, Randall Coleman, and Wendy Chow. CTIA members were represented by Gordon Wiles and Ben Almond of BellSouth, and BellSouth consultants Gary Comparetto and Thu Nguyen, of Radio Dynamics Corporation. The FCC was represented by Dale Hatfield, Pam Gerr, Chuck Magnuson, John Williams, Charles Iseman, Tom Derenge and Rod Small.

Pursuant to Section 1.1206 of the Commission's Rules, an original and one copy of this letter and its attachments are being filed with your office. If you have any questions concerning this submission, please contact the undersigned.

Sincerely,

  
Cleveland Lawrence III

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**POINT PAPER ON  
SPECTRUM AVAILABILITY FOR  
TERRESTRIAL FIXED MICROWAVE TELECOMMUNICATIONS**

**Background**

- The Fixed Wireless Communications Coalition is made up of microwave communications users, e.g., railroads, pipeline, electric/gas/water utilities, commercial businesses both small and large, telephone service providers, broadcasting interests, cable TV interests, public safety, State and Local Governments plus microwave equipment manufacturers. Together a multi-billion dollar investment is involved.
- The U.S. domestic economic infrastructure is heavily dependent upon terrestrial microwave communications; also significant is the infrastructure for public safety.
- Microwave technology is the cornerstone of new, emerging wireless services that hope to compete in local telephone marketplaces fulfilling one of the objectives of 1996 Telecommunications Act.
- Superimposition of additional satellite systems upon frequency bands used for fixed microwave communications has a critical adverse impact present operations and future growth of the latter for which there is no viable substitute.
- Future of terrestrial microwave operations is in jeopardy as the FCC reallocates more and more spectrum for other uses primarily for satellite systems.

**Action**

- Importance of terrestrial microwave communications to the U.S. public interest, must be recognized with the FCC giving appropriate weight to microwave user needs in deliberating spectrum allocation issues.
- Spectrum conservation measures have been applied to virtually all other radio telecommunications systems. Satellite systems should now be required to institute spectrum conservation measures as well, rather than be allowed unlimited access to huge bands of spectrum at the expense of all other services.
  - Satellite operators shall be required to design their systems to facilitate viable sharing of the spectrum with existing and

future terrestrial systems. Billions of dollars have been invested already in terrestrial fixed systems and future growth must be taken into account.

- Provide for more sharing of Government held FS spectrum (not reallocation of government spectrum) with the private FS sector. Federal Government telecommunications are important and require access to spectrum too. Needed are procedures to coordinate and simplify the sharing between Government and non-Government systems.
- Strengthen substantially the domestic and international role of the FCC Wireless Telecommunications Bureau and the Office of Engineering and Technology within the FCC in spectrum policy and management issues.

# **PUBLIC SAFETY USE OF FIXED MICROWAVE FACILITIES**

## **Typical Use**

Principal use is to provide "backbone" for mobile two-way radio networks operated by police, fire, and other public safety agencies. For example, a state, county, or city public safety agency is likely to need multiple transmitter sites to cover its area of jurisdiction with an adequate radio signal. Each of those sites must be tied together and connected to the central dispatch center. Other common uses include connecting emergency command and control centers for disaster relief operations, and for traffic and public works management. Fixed point-to-point microwave is the most reliable, secure, and cost-efficient method these public safety communications requirements.

## **Expanding Public Safety Need for Fixed Microwave**

The trend in public safety communications is towards larger "trunked" radio systems used by many agencies within a wide geographic area. Such shared systems are more efficient and provide greater "interoperability" between different agencies that need to respond to emergencies. However, these wide area systems necessarily involve many transmitter sites (and, therefore, microwave links), especially in the 800 MHz band, one of the few bands available for new public safety mobile radio systems. Indeed, pursuant to a Congressional mandate, the FCC recently reallocated 24 MHz for public safety use just below 806 MHz. Over the next 10 to 15 years, hundreds of new mobile radio systems are likely to be built in this band, each requiring microwave backbone frequencies. Unfortunately, frequencies available for such microwave facilities have been greatly diminished with the reallocation of the 2 GHz bands, and the relocation of 2 GHz facilities to 6 GHz and other bands.

## **Lack of Alternatives**

In most cases, there are no viable alternatives for public safety agencies other than microwave facilities. Fiber optic lines are sometimes used, but are still many times more expensive than microwave, require rights-of-way, and often cannot reach remote transmitter locations. Reliability of fiber also remains an issue, both for above-ground installation, which is subject to storm damage, and for underground installation, which is subject to accidental cuts by construction crews and breakage, especially in earthquake prone areas.

## **Conclusion**

Existing microwave bands must be preserved and additional microwave allocations are necessary to accommodate current and future public safety radio systems.

For further information, please contact: Robert Gurss, Wilkes, Artis, Hedrick & Lane, counsel for the Association of Public-Safety Communications Officials-International (APCO), at 202-457-7329 or [rgurss@wahlone.com](mailto:rgurss@wahlone.com).

# MSS/FSS Impact on Point - to - Point Microwave: Brief to FCC

Gordon Wiles

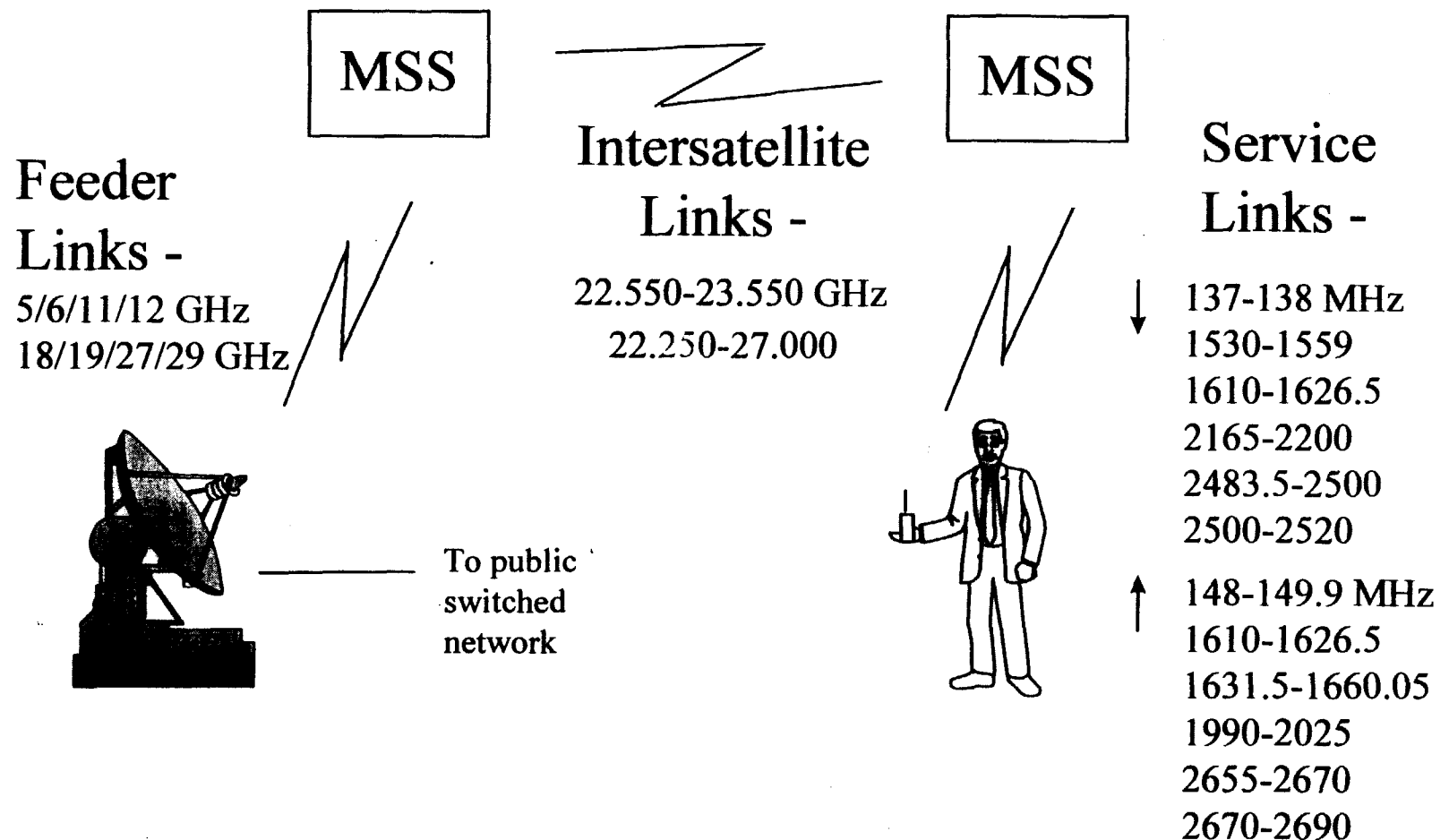
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## Consequences of Emerging Technology on Microwave Relocation

- PCS (1.8GHz band) - 4,500 paths
- 2.1GHz MSS - roughly 10,000 paths
- Frequency congestion already exists at 6GHz
- Fiber is not an alternative in many cases
- 6, 11, & 18GHz bands are all in jeopardy due to MSS receiving co-primary allocations internationally
- MSS/FSS earth terminals create “exclusion zones”
  - ◆ Spectrum sharing in most cases will become unfeasible over time (e.g... 4GHz sharing with “C” band satellite)
- FS interests must be considered in making U.S. spectrum policy decisions

# Current MSS Frequency Allocations



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## Individual Company Impact\*

	<b>BellSouth</b>	<b>SW Bell</b>	<b>AT&amp;T</b>
<b><u>Frequency</u></b>	<b><u># Paths</u></b>	<b><u># Paths</u></b>	<b><u># Paths</u></b>
■ 2.1GHz	148	122	140
■ 6GHz	2,198	2,714	3,654
■ 10GHz	184	100	106
■ 11GHz	1,479	1,323	396
■ 18GHz	394	257	166
■ 23GHz	219	43	15
■ <b>Total</b>	<b>4,613</b>	<b>4,559</b>	<b>4,477</b>

\* Represents a partial data base search for each company

## Individual Company Impact\* (continued)

	BellAtlantic	Sprint	US West
<u>Frequency</u>	<u># Paths</u>	<u># Paths</u>	<u># Paths</u>
■ 2.1GHz	0	6	19
■ 6GHz	1,185	1,312	35
■ 10GHz	34	13	44
■ 11GHz	2,344	51	3,870
■ 18GHz	0	31	176
■ 23GHz	41	61	7
■ <b>Total</b>	<b>3,604</b>	<b>1,474</b>	<b>4,151</b>

\* Represents a partial data base search for each company

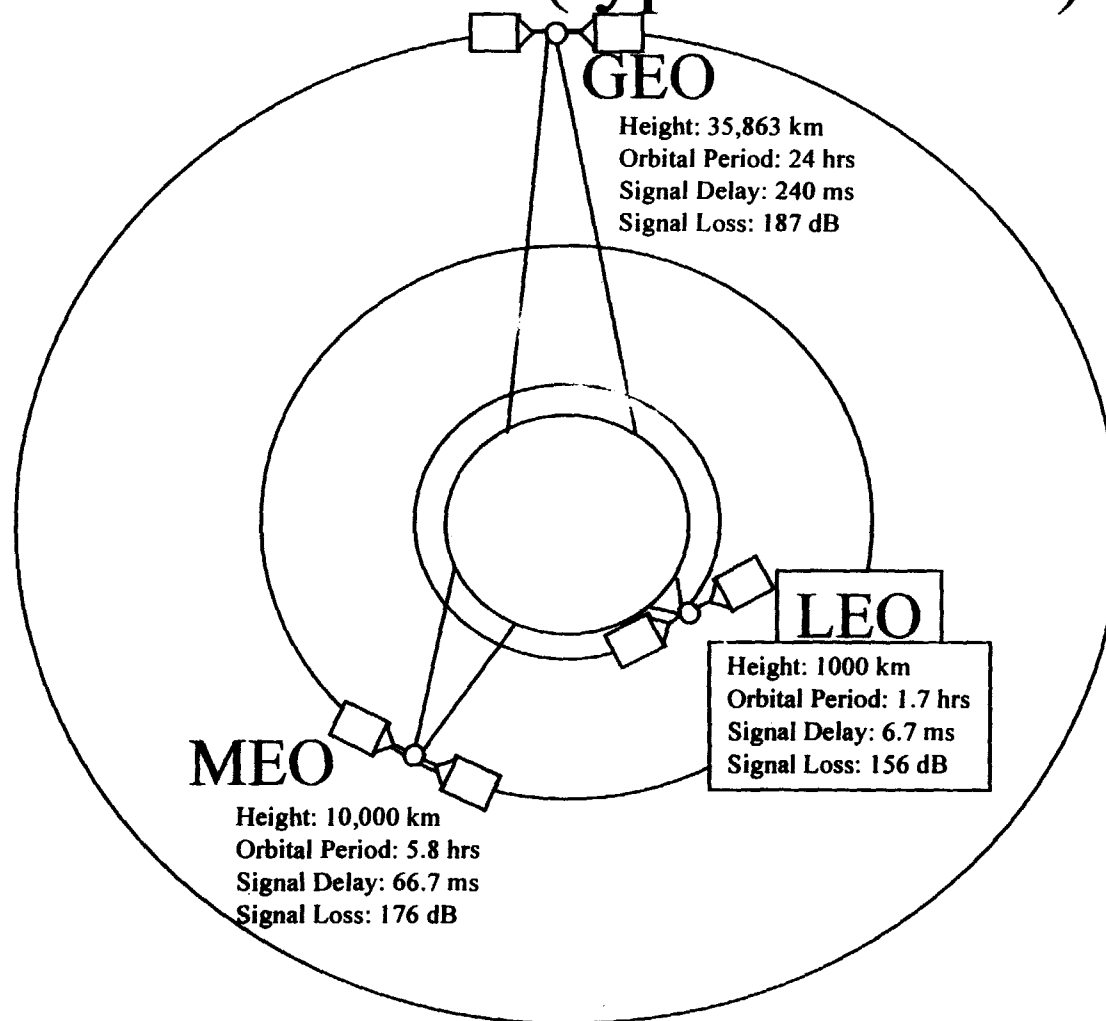
■ **This represents in excess of 23,000 links for these 6 companies alone!**



## Mobile and Fixed Satellite Service: System Description

- Satellites of varying numbers and constellation architectures providing global satellite phone service-- as well as data, fax, and paging
- Non-geosynchronous orbit (NGSO)
  - ◆ Low earth orbit, LEO (~ 1000 km )
  - ◆ Medium earth orbit, MEO (~ 10,000 km)
- Geosynchronous orbit (GSO)
  - ◆ Geosynchronous orbit (GEO) (~ 35,863 km) altitude

## Comparison of Orbits (typical values)



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## 2.1GHz MSS: Major Players

### ■ NGSO

- ◆ GlobalStar (LEO)

- ✦ Joint Loral/Qualcomm venture

- ◆ Iridium (LEO)

- ✦ Consortium of 17 owners, including Motorola, Lockheed Martin, and Raytheon

- ◆ ICO P (MEO)

- ✦ ICO Global Communications backed by 44 international investors including COMSAT and Hughes Space and Comms. International

### ■ GSO

- ◆ INMARSAT

- ✦ International consortium comprising most countries



## 18GHz FSS: Some Major Players (21 MSS/FSS Applications in this band alone!)

### ■ NGSO

- ◆ Teledesic: Teledesic (Bill Gates and Craig McCaw)
- ◆ SkyBridge (Alcatel)
  - ✦ 11GHz band as well

### ■ GSO

- ◆ Astrolink (Lockheed)
- ◆ Galaxy (Hughes)

### ■ Constellations with both GSO and NGSO satellites

- ◆ Celestri: (Motorola)
- ◆ GlobalStar
- ◆ SPACEWAY

## Definitions

- FS = fixed service (point-to-point microwave)
- FSS = fixed satellite service
  - ◆ “Fixed” implies that the earth terminal does not move
  - ◆ FSS constellations may use GSO and/or NGSO satellites
- MSS = mobile satellite service
- PLMN = public land mobile network
- CC = common carrier
- POF = private operational fixed (former FCC Part 94 FS licensees)



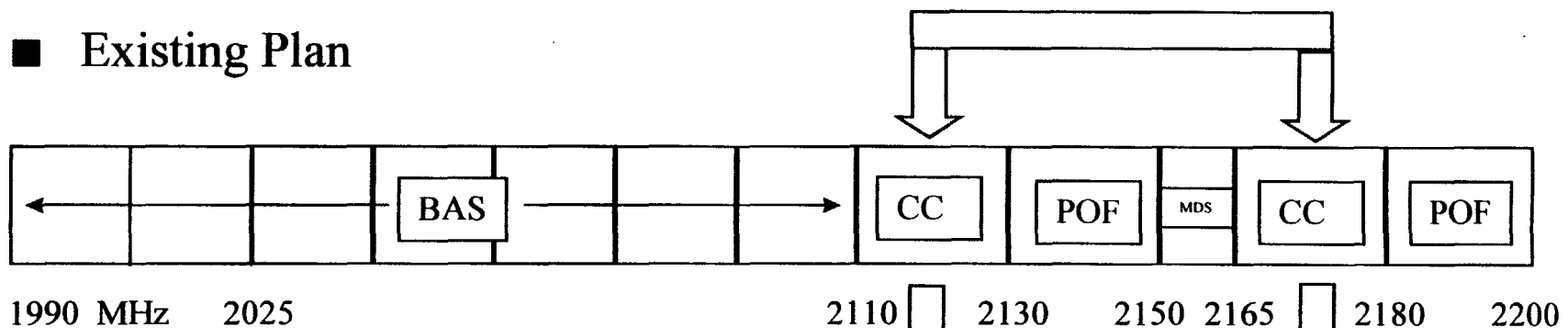
## Impact - 2.1GHz Band

- FCC Notice in ET Docket No. 95-18 proposes to reallocate 70 MHz of spectrum in the 2.1 GHz band to accommodate Mobile Satellite Service (MSS) (Effective January 1, 2000)
  - ◆ Harmful interference determined by applying TIA TSB86
    - ✦ Being developed by TIA/NSMA 2.1 GHz JWG
- Early calculations suggest significant % of FS links will be impacted and subject to relocation

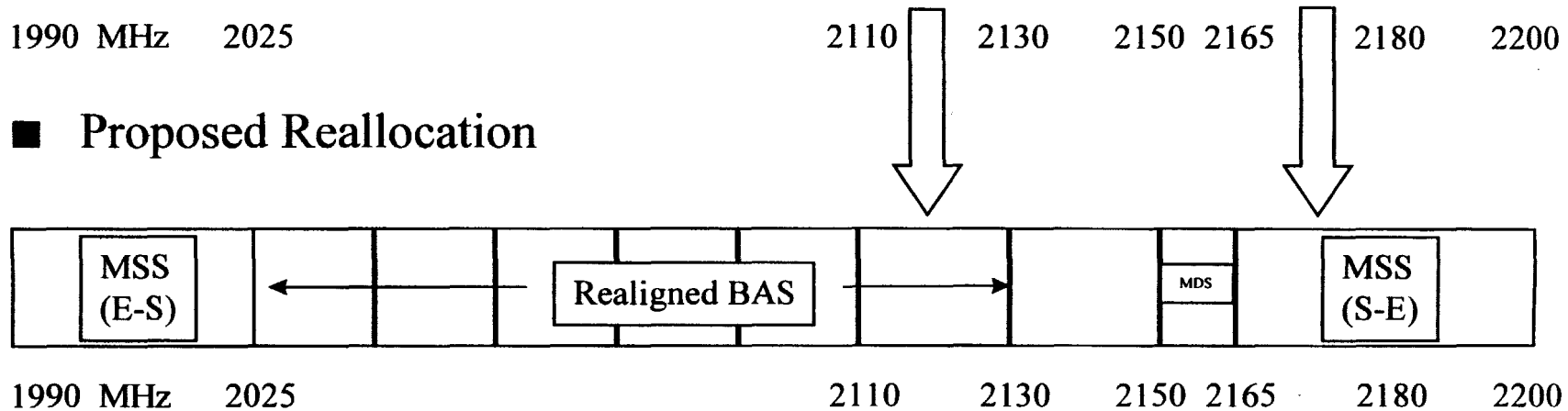
# FCC Proposed Reallocation

## Cellular Interconnect Frequencies

### ■ Existing Plan



### ■ Proposed Reallocation



### ■ Under ET95-18, is there a loop-hole relative to reimbursement?



## Dilemmas for Our Companies: Sharing Criteria

- The sharing approach in this band if achievable will set the blueprint for sharing in other bands
  - ◆ Tens of thousands of paths in all bands at risk
- Must avoid problems with new MSS service providers that cause interference after the sunset period

## Dilemmas for Our Companies: Cost Issues

- MSS is reducing FS spectrum which provides low cost network interconnect alternatives
- What band to move to? All FS bands have MSS/FSS co-allocations!
- Costs vary by band
  - ◆ BellSouth Example: \$300k/path x 148 paths = \$45 million (2.1 GHz band moving to upper bands)
- MSS interests are on record opposing reimbursement for microwave relocation
  - ◆ They didn't even have to pay for their spectrum!



## Dilemmas for Our Companies: Other Considerations

- Potential for service interruption
  - ◆ During relocation
  - ◆ Caused by interference due to incorrect sharing criteria
- Cost of new point-to-point paths may be higher in other bands
  - ◆ Grid antennas only usable in 2.1 GHz band
    - ✦ wind loading issues => new towers may be required
  - ◆ 2.1 GHz paths may be too long for other bands
    - ✦ More repeater sites may be required
  - ◆ Waveguide instead of heliax

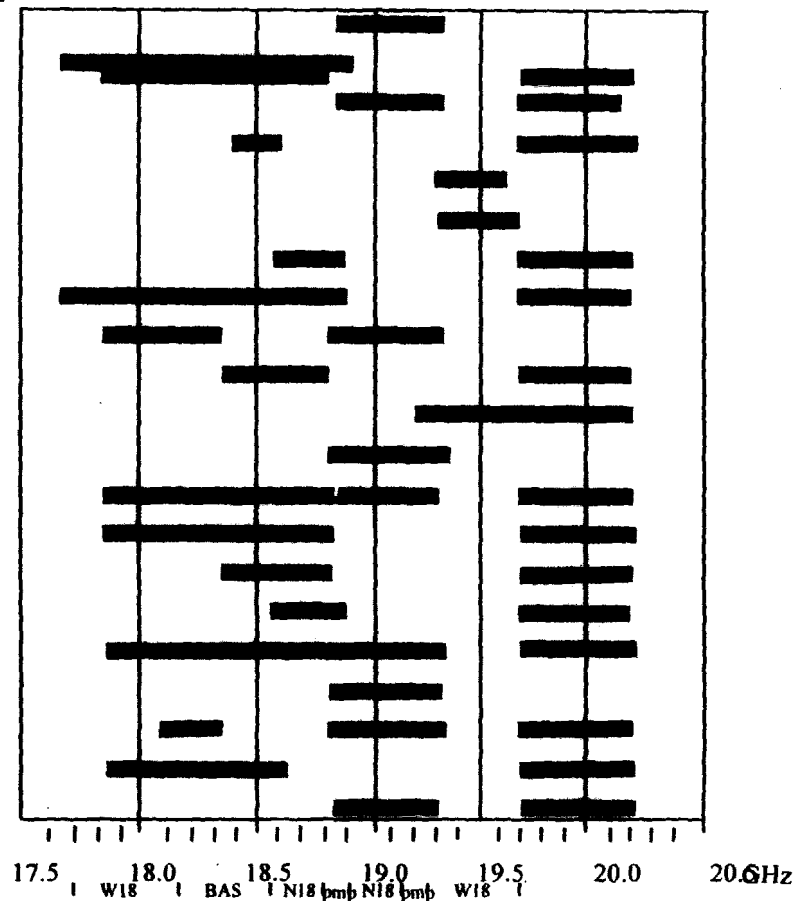
## Impact - 18GHz Band

- 17.7-19.7 GHz band sought by FSS community to support feeder and service links for GSO and NGSO systems
  - ◆ Tens of thousands of paths at risk
- WRC-97 generally favorable toward FSS 18 GHz operations
- NGSO FSS allocation solidified at 18.8-19.3 GHz
  - ◆ Blanket licensing of FSS ground stations a key concern
    - ✦ Teledesic envisions an antenna on every rooftop
- Parameters for FSS/FS sharing being formulated
  - ◆ Several WRC-97 resolutions call for additional sharing evaluations
  - ◆ NPRM expected shortly asking questions on FS/FSS sharing
  - ◆ JTG 4-9-11 set up to verify proposed PFDs for WRC-99
  - ◆ 18GHz JWG



# KA-Band FSS Applications

<u>Applicant</u>	<u>GSO/NGSO</u>
Teledesic	NGSO
Teledesic Gigalinks	NGSO
CyberStar	GSO
Motorola Celestri LEO	NGSO
Motorola Celestri GEO	GSO
GlobalStar	GSO/NGSO
Iridium	NGSO
CAI Data Systems	GSO
Pacific Century Group	GSO
Lockheed Astrolink	GSO
Orion F-5 and F-10	GSO
Hughes Galaxy	GSO
GE	GSO
Lockheed Astrolink Phase II	GSO
Hughes SPACEWAY EXP	GSO
DirectCom	GSO
PanAmSat	GSO
TRW	GSO/NGSO
Hughes SPACEWAY	GSO/NGSO
NGSO	NGSO
Lockheed LM-MEO	NGSO
SkyBridgeII	NGSO



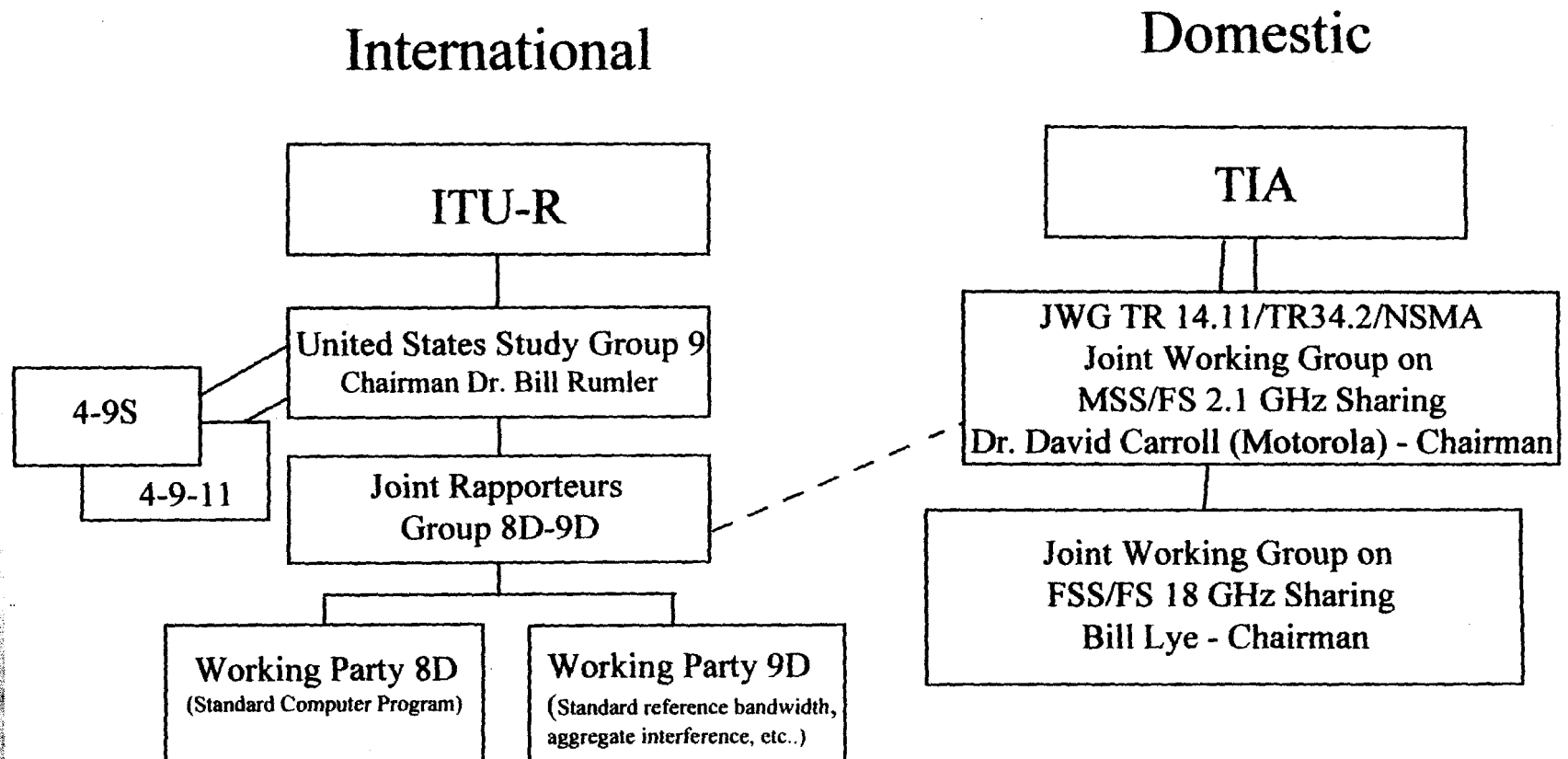
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## Dangers for Our Companies: Unfavorable Sharing Criteria or Procedures

- More precedents set in this band
  - ◆ FS and FSS are co-primary (NGSO or GSO)
- Who pays to move the FS system? (Co-primary issue)
- Both FS-into-FSS and FSS-into-FS interference issues
- Cost to move?
  - ◆ What band to move to?
  - ◆ Costs vary by band
  - ◆ BellSouth Example: \$80k/path x 394 paths = \$31.5 million (18 GHz band)



# Standards Bodies Addressing MSS/FS and FSS/FS Sharing (cooperative efforts)



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## Issues & Areas of Focus

- FCC should be mindful of the impact to existing wireless services
  - ◆ changes to FS spectrum allocations will be disruptive, service affecting and costly!
- FS needs must be considered in formulating U.S. positions at WRC
- Wireless industry needs to convey our FS needs & concerns with the FCC, NTIA & Congress

## Issues & Areas of Focus (continued)

- New spectrum needs to be identified to accommodate FS
  - ◆ 7/8 & 15GHz would be viable alternatives
- Apply current reimbursement rules to all FS that become subject to relocation due to MSS/FSS
  - ◆ Language in ET 95-18 is unclear regarding reimbursement caused by displacement of BAS
- Spectrum sharing criteria of the TIA/NSMA Joint Working Groups should be incorporated in rulemakings